Of these thirty species only two were determined as occurring in Cutch previously, namely *Trigonia Smeei* and *T. ventricosa*. The former has long been known as an Indian species, and the latter also in India as well as in the Uitenhage strata of South-east Africa, and lately it has been found in German East Africa.

In the Appendix at page 121 Dr. Kitchin refers to the Mesozoic Mollusca collected during W. Bornhardt's Journey in German East Africa (1895–97), and described by Dr. G. Müller in 1900, who regards two of the species as Jurassic; but two of the others he considers to be of Lower Neocomian age, namely *T. ventricosa*, Krauss, and its associate *T. Beyschleyi*, Müller. *T. Kuehni*, Müller, is said to be of Upper Neocomian age. It is evidently certain that there is a resemblance (Dr. Kitchin says) of the German East-African fossils to those of the Oomia group and those of Uitenhage, as far as the lamellibranchs bear evidence at present (pages 2, 115, 121, &c.).

The numerous figures of *Trigoniæ* in the ten lithographic plates are excellently well drawn, of natural size, by Miss G. M. Woodward, of London.

Circulars on Agricultural Economic Entomology.
Issued by the Trustees, Indian Museum.

We have received the following numbers of these useful publications, which are accompanied with good recognizable uncoloured illustrations, and are issued at the price of 3 or 4 annas per dozen, for general circulation in India.

No. 1. The Rice Sapper (*Leptocorisa acuta*).
2. The Bengal Rice Hispa (*Hispa œnescens*).
3. The Sugar-cane Borer (*Chilo simplex*).
4. The Rhinoceros or Date-Palm Beetle (*Oryctes rhinoceros*).
5. The North-west or Migratory Locust (*Acridium peregrinum*).
6. The Cut-Worm (*Agrotis ypsilon*).

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

January 20th, 1904.—Sir Archibald Geikie, D.C.L., D.Sc., Sec.R.S., Vice-President, in the Chair.

The following communication was read:—

'On the Jaws of *Ptychodus* from the Chalk.' By Arthur Smith Woodward, LL.D., F.R.S., F.L.S., F.G.S.

Hitherto no traces of the cartilaginous jaws of this fish have been found in association with the dentition; but Mr. Henry Willett has

recently found a specimen of *Ptychodus decurrens*, in the zone of *Holaster subglobosus* of the Lower Chalk at Glynde (Sussex). Fragmentary remains of both jaws are seen in the specimen, each bearing many of the characteristic teeth arranged in natural order. There are four series, and one small displaced tooth (probably belonging to the fifth series), on the left of the large median series in the lower jaw; while in the upper jaw the teeth are clearly arranged in six paired series. The specimen proves that the peculiarly effective disposition characteristic of the living Myliobatidæ had not been assumed, but that *Ptychodus* more nearly resembled the Trygonidæ in its jaws. The probable explanation of the new discovery is, that in the Cretaceous Period, the great Rays of the 'families' Myliobatidæ and Trygonidæ had not become fully differentiated. Prof. Jækel has already arrived at a similar conclusion from general considerations, and has proposed to place all these fishes in one comprehensive family, termed Centrobatidæ. If this arrangement be adopted, *Ptychodus* represents a primitive sub-family, which still awaits definition from lack of complete specimens; while the Trygoninæ, Myliobatinæ, and Ceratopterinæ are equivalent sub-families which survive at the present day.

April 13th, 1904.—J. E. Marr, Sc.D., F.R.S., President, in the Chair.

The following communication was read:—

'The Discovery of Human Remains under the Stalagmite-Floor of Gough's Cavern, near Cheddar.' By Henry Nathaniel Davies, Esq., F.G.S.

Gough's Cavern opens at the base of the cliffs on the south side of Cheddar Gorge. Various human and animal remains have been discovered at different times in the clearing-out of parts of the main cavern. The principal deposits are a stalagmite-like travertine overlying cave-earth, and the latter at one place encloses a tabular limestone-block surrounded with flint-chips. During drainage-operations it was found necessary to excavate part of a fissure running northward out of the vestibule of the cavern, when a human skeleton was discovered, associated with flakes, scrapers, and borers of flint, embedded in cave-earth, which overlay a lower bed of stalagmite and was overlain by a second bed 5 inches thick. The skeleton was nearer the top than the bottom of the deposit, and the remains excavated comprise the skull, the bones of an arm, a leg, and part of the pelvic girdle. The other bones were allowed to remain *in situ*, and may now be seen. The position of the skeleton was that which would have been assumed by a drowned man. Interment is out of the question, because of the narrow and steep shape of the fissure, which was choked up with undisturbed débris and calcareous deposits. The stature of the man was 5 feet 5 inches;

he was of muscular build, with prognathous jaws, a straight thigh, an extremely platycnemic tibia, and a thick dolichocephalic skull. The animal-remains found in the cave-earth of other parts of the Cavern, and held by the Author to be contemporaneous with that in the fissure, are those of mid- and late Pleistocene age; and this evidence, together with that derived from the position of the skeleton, the shape of the cranium, and the form and workmanship of the flakes, points to a period towards the close of the Palæolithic or the opening of the Neolithic Age.

MISCELLANEOUS.

The Action of Human Serum on certain Pathogenic Trypanosomes; Action of Arsenious Acid upon Trypanosoma gambiense. By A. Laveran.

In previous notes (1st April, 1902, and 6th July, 1903) I have shown that human serum injected in sufficient doses into mice or rats affected with Nagana, Mal de Caderas, or Surra, caused the Trypanosomes to disappear, at least temporarily, from the greater circulation.

A mouse weighing 20–25 grammes required 0·5 to 1 c.c. of human serum; a rat of 200 grm., 2–3 c.c. of serum or 0·20–0·30 grm. of dry serum in powder.

The Trypanosomes disappear in 24 or 36 hours from the larger circulation, but reappear in general at the end of a few days. Sometimes their disappearance is definitive. The most frequently repeated injections of human serum do nothing more than prolong the life of the animals.

In the month of November, 1903, Drs. Dutton and Todd sent me through Dr. Annett two rats, one infected with *Trypanosoma gambiense*, the other with a *Trypanosoma* of horses from the Gambia. It appeared demonstrated that *Tr. gambiense*, discovered by Forde and Dutton in Gambia, is identical with the *Trypanosoma* described by Castellaini under the name of *Tr. ugandense*, as the pathogenic agent in the disease called "sleeping sickness." The study of this parasite is therefore, from the medical point of view, of great interest.

One might think, *à priori*, that *Tr. gambiense*, which is developed in the blood of man, as in that of many other mammals, would not be influenced by human serum, contrary to that which takes place in the case of the Trypanosomes of Nagana, Surra, and Caderas, diseases against which man is naturally immune. This is precisely the result of my observations. Human serum injected in doses of 0·20–0·30 grm. of the powder, in the case of rats weighing 170 to 200 grm. infected with *Tr. gambiense*, proved entirely inactive.

At the beginning of the infection of rats with *Tr. gambiense*, the Trypanosomes are very rare in the blood, and it happens that after